



UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

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SATOSHI NISHIKAWA ET AL.

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APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

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1. ☐ Fee Transmittal Form
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- a. ☒ Newly executed (original or copy)
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(for continuation/divisional with Box 17 completed)
[Note Box 5 below]

i. ☐ **DELETION OF INVENTOR(S)**
Signed Statement attached deleting
inventor(s) named in the prior application, see
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5. ☐ Incorporation By Reference (useable if Box 4c is checked)
The entire disclosure of the prior application, from which a copy of
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8. ☒ Assignment Papers (cover sheet & document(s))
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CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS (37 CFR 1.16(c))	14-20 =	0	X \$ 18.00 =	\$ 0.00
	INDEPENDENT CLAIMS (37 cfr 1.16(b))	4-3 =	1	X \$ 78.00 =	\$ 78.00
	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.16(d))			\$260.00 =	\$ 0.00
				BASIC FEE (37 CFR 1.16(a))	\$ 760.00
			Total of above Calculations =		\$ 838.00
	Reduction by 50% for filing by small entity (Note 37 CFR 1.9, 1.27, 1.28).				
				TOTAL =	\$ 838.00

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- a. ☐ A Small entity statement is enclosed
- b. ☐ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.
- c. ☐ Is no longer claimed.

20. ☒ A check in the amount of \$ 838.00 to cover the filing fee is enclosed.

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- a. ☒ Fees required under 37 CFR 1.16.
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

NAME	Leonard P. Diana, Reg. No. <u>28286</u>
SIGNATURE	<u>[Signature]</u>
DATE	December 21, 1999

TITLE OF THE INVENTION
PRINTING CONTROL METHOD AND APPARATUS

BACKGROUND OF THE INVENTION

5

FIELD OF THE INVENTION

The present invention relates to a separation paper
insertion printing processing method and apparatus and,
more particularly, to a separation paper insertion printing
10 processing method and apparatus in a system having a printer
and an information processing apparatus such as a personal
computer.

DESCRIPTION OF THE RELATED ART

15 Conventionally, there is a printing control method
having a separation paper insertion function. According
to this separation paper insertion function, when a system
having a printer and an information processing apparatus
such as a personal computer is to print data on media such
20 as OHP films for which it is undesirable that output results
overlap each other, the system prints data while inserting
separation paper functioning to prevent the output results
from overlapping each other and also functioning as layout
paper or anti-offset paper.

25 Depending on settings, the same contents as those of
a corresponding OHP film can be printed on separation paper,

or separation paper can be output as blank paper.

Also, there is a printing control method having a blank paper saving function of saving paper by not printing pages having no print data.

5 However, the printing control method having the conventional separation paper insertion function does not consider any output order of prints. Thus, even if a printer system can perform backward printing (start printing data from the final page) considering face-up
10 discharge printing, it cannot select whether to print separation paper before or after an output page of a corresponding OHP film.

 The conventional blank paper saving function may be used together with the separation paper insertion function.
15 In this case, however, when an output page having no print data exists such that separation paper is set not to be printed by the separation paper insertion function, the blank paper saving function is effected not to allow normal separation paper insertion printing.

20 The present invention has been made to overcome the conventional drawbacks, and has as its object to provide a printing control method capable of normally inserting separation paper regardless of a designated printing order.

 It is another object of the present invention to
25 provide a printing control method capable of normally inserting separation paper even when both the blank paper

saving function and separation paper insertion function are used.

SUMMARY OF THE INVENTION

5 More specifically, according to an aspect of the present invention, there is provided a printing control method of controlling a printing device to output predetermined data onto a printing medium, comprising the separation printing check step of checking a separating
10 printing setting, set in advance, representing whether a predetermined medium is additionally output over each page of the output, the printing order check step of checking a printing order setting, set in advance, representing whether the predetermined data is output from a final page
15 or first page, and the control step of, when the separation printing setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the first page, controlling to output each page of the output and then
20 additionally output the predetermined medium before a next page is output, and when the separation printing setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the final page, controlling to
25 additionally output the predetermined medium before each page of the output is output.

According to another aspect of the present invention,
there is provided a printing control apparatus for
controlling a printing device to output predetermined data
onto a printing medium, comprising separation printing
5 check means for checking a separating printing setting, set
in advance, representing whether a predetermined medium is
additionally output over each page of the output result,
printing order check means for checking a printing order
setting, set in advance, representing whether the
10 predetermined data is output from a final page or first page,
and control means for, when the separation printing setting
is set to additionally output the predetermined medium and
the printing order setting is set to output the
predetermined data from the first page, controlling to
15 output each page of the output result and then additionally
output the predetermined medium before a next page is output,
and when the separation printing setting is set to
additionally output the predetermined medium and the
printing order setting is set to output the predetermined
20 data from the final page, controlling to additionally
output the predetermined medium before each page of the
output result is output.

According to still another aspect of the present
invention, there is provided a storage medium storing a
25 program which can be executed by an apparatus, wherein the
apparatus which executes the program is operated as a

printing control apparatus for controlling a printing device to output predetermined data onto a printing medium, the printing control apparatus having separation printing check means for checking a separating printing setting, set in advance, representing whether a predetermined medium is additionally output over each page of the output result, printing order check means for checking a printing order setting, set in advance, representing whether the predetermined data is output from a final page or first page, and control means for, when the separation printing setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the first page, controlling to output each page of the output result and then additionally output the predetermined medium before a next page is output, and when the separation printing setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the final page, controlling to additionally output the predetermined medium before each page of the output result is output.

Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing an arrangement of an information processing system according to an embodiment of the present invention;

Fig. 2 is a block diagram showing the flow of a typical printing sequence in a host computer connected to a printer;

Fig. 3 is a block diagram showing an arrangement in which an arrangement concerning an intermediate code spool function is added to the arrangement of Fig. 2;

Fig. 4 is a flow chart showing the feature of a processing sequence according to the present invention;

Fig. 5 is a sectional view showing the internal structure of a laser beam printer;

Fig. 6 is a flow chart showing a feature of the processing sequence according to the present invention; and

Fig. 7 is a view showing a user interface of a printer driver in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Several preferred embodiments of the present invention will be described below with reference to the accompanying drawings.

The arrangement of an information processing system according to the first embodiment of the present invention will be explained with reference to the block diagram of

Fig. 1. As far as the functions of the present invention are executed, the present invention may be applied to a single device, a system constituted by a plurality of devices, or a system which performs processing while being connected via a network such as a LAN (Local Area Network) or WAN (Wide Area Network).

The information processing system according to the first embodiment is constituted by a host computer 3000 and printer 1500. The host computer 3000 comprises a CPU 1, RAM 2, ROM 3, keyboard controller (KBC) 5, CRT controller (CRTC) 6, disk controller (DKC) 7, printer controller (PRTC) 8, keyboard (KB) 9, CRT display (CRT) 10, and external memory 11. The keyboard 9 is generally connected to a pointing device such as a mouse, tablet, or joystick.

The structures of the respective components of the host computer 3000 will be first described in detail. The CPU 1 is a central processing unit for integrally controlling respective devices connected to a system bus, and executes processes for documents comprises figures, images, characters, tables (including spreadsheets and the like), and the like on the basis of document processing programs stored in a program ROM 3b of the ROM 3 or the external memory 11. The CPU 1 executes, e.g., mapping (rasterizing) processing of an outline font to a display information RAM set on the RAM 2, and enables WYSIWYG (What You See Is What You Get: a function capable of obtaining

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a print output with a size and shape displayed on a CRT display screen) on the CRT display 10.

Further, the CPU 1 opens various windows registered in advance and executes various data processes on the basis of commands instructed with a mouse cursor (not shown) on a GUI or the like displayed on the CRT display 10. When a user is to print data using the printer 1500, he/she can open a window concerning printing settings to set a printing processing method for a printer driver including settings of the printer 1500 and selection of a printing mode.

The RAM 2 functions as a main memory, work area, and the like for the CPU 1. The ROM 3 comprises a font ROM 3a, the program ROM 3b, and a data ROM 3c. The font ROM 3a or external memory 11 stores font data and the like used in document processing. The program ROM 3b or external memory 11 stores an operating system (to be referred to as an OS) and the like as control programs of the CPU 1. The data ROM 3c or external memory 11 stores various data used in document processing and the like.

The keyboard controller (KBC) 5 controls inputs from the keyboard 9 and pointing device (not shown). The CRT controller (CRTC) 6 controls display on the CRT display (CRT) 10. The disk controller (DKC) 7 controls access to the external memory 11. The printer controller (PRTC) 8 is connected to the printer 1500 via a bidirectional interface 21, and executes communication control

processing with the printer 1500. The keyboard 9 has various keys. The CRT display (CRT) 10 displays figures, image characters, tables, and the like.

The external memory 11 is realized by a hard disk (HD), floppy disk (FD), magneto-optical disk (MO), and the like, and stores boot programs, various applications, font data, user files, edit files, printer control command generation programs (printer drivers), and the like. The above-described CPU 1, RAM 2, ROM 3, keyboard controller (KBC) 5, CRT controller (CRTC) 6, disk controller (DKC) 7, and printer controller (PRTC) 8 are arranged on a computer control unit 2000.

The structures of the respective components of the printer 1500 will be described in detail. A CPU 12 is a central processing unit for integrally controlling respective devices connected to a system bus 15, and outputs image signals as output information to a printer unit (printer engine) 17 on the basis of control programs and the like stored in a program ROM 13b (to be described below) of a ROM 13 or control programs and the like stored in an external memory 14. The CPU 12 can communicate with the host computer 3000 via an input unit 18, and can notify the host computer 3000 of internal information of the printer 1500 and the like. A RAM 19 functions as a main memory, work area, and the like for the CPU 12, and the memory capacity of the RAM 19 can be expanded by an option RAM (not

shown) to be connected to an expansion port.

Note that the RAM 19 is used as an output information mapping area, environment data storage area, NVRAM, and the like. The ROM 13 comprises a font ROM 13a, the program ROM 13b, and a data ROM 13c. The font ROM 13a stores font data and the like used to generate output information. The program ROM 13b stores control programs and the like for the CPU 12. The data ROM 13c stores information used in the host computer 3000 when the external memory 14 such as a hard disk is not connected to the printer 1500.

The input unit 18 allows exchanging data between the printer 1500 and host computer 3000 via the bidirectional interface 21. A printing unit interface (I/F) 16 allows exchanging data between the CPU 12 and printer unit 17. A memory controller (MC) 20 controls access to the external memory 14. The printer unit 17 performs printing operation under the control of the CPU 12. An operation unit 1501 comprises switches for various operations, display means (e.g., a liquid crystal panel display or LED display), and the like. The external memory 14 is realized by a hard disk (HD), IC card, and the like, and is optionally connected to the printer 1500.

The external memory 14 stores font data, emulation programs, form data, and the like, and is accessed under the control of the memory controller (MC) 20. Note that the external memory 14 is not limited to one, and the printer

1500 can use a plurality of external memories 14. That is, the printer 1500 can be connected to a plurality of external memories 14 such as an optional card in addition to internal fonts, and an external memory storing programs for

5 interpreting different printer control languages. Further, the printer 1500 may adopt an NVRAM (not shown) to store printer mode setting information from the operation unit 1501.

The above-described CPU 12, RAM 19, ROM 13, input unit
10 18, printing unit interface (I/F) 16, and memory controller (MC) 20 are arranged on a printer control unit 1000. In this embodiment, the printing control method of the present invention is stored in, e.g., the external memory 11 as software executed by the CPU 1 of the host computer 3000.

15 Fig. 2 is a block diagram showing the flow of typical printing processing in the host computer connected to a printing apparatus, such as a printer, directly or via a network. In Fig. 2, an application 201 for creating a document to be printed, graphic engine 202, printer driver
20 203, and system spooler 204 exist as files stored in the external memory 11 in Fig. 1, and serve as program modules executed by loading them to the RAM 2 by an OS or modules using these modules in execution. The application 201 and printer driver 203 can be additionally stored in an HD
25 serving as an external memory 11 from an FD or CD-ROM serving as another external memory 11 or via a network (not shown).

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The application 201 stored in the external memory 11 is loaded to the RAM 2 and then executed. In printing data from the application 201 by the printer 1500, data is output (drawn) using the graphic engine 202 which is similarly loaded to the RAM 2 and can be executed. The graphic engine 202 similarly loads, from the external memory 11 to the RAM 2, the printer driver 203 installed from the host computer 3000 in advance for each usable printing apparatus, and sets an output from the application 201 to the printer driver 203. The graphic engine 202 transforms a GDI (Graphic Device Interface) function received from the application 201 into a DDI (Device Driver Interface) function, and outputs the DDI function to the printer driver 203.

Based on the DDI function received from the graphic engine 202, the printer driver 203 converts a printing instruction into a control command such as a PDL (Page Description Language) the printer can recognize. The converted printer control command is output as print data to the printer 1500 through the bidirectional interface 21 via the system spooler 204 loaded to the RAM 2 by the OS.

The information processing system according to the first embodiment has the arrangement made up of the printer 1500 and host computer 3000 shown in Figs. 1 and 2, and in addition an arrangement of temporarily spooling print data from an application by intermediate code data, as shown in Fig. 3. Fig. 3 shows an expanded arrangement of the system

in Fig. 2 in which a spool file 303 made up of intermediate codes is temporarily generated in transmitting a printing instruction from the graphic engine 202 to the printer driver 203. Note that arrows in Fig. 3 indicate a main data flow concerning printing. In practice, information is exchanged bidirectionally between components.

A despatcher 301, spooler 302, spool file manager 304, and despooler 305 added to the arrangement of Fig. 3 in the first embodiment are respectively stored as program module files stored in the external memory 11, and loaded to the RAM 2 and executed by an OS or another program module in execution. The spool file 303 is assigned to a predetermined area in, e.g., the external memory 11.

In the system of Fig. 2, the application 201 is released from printing processing after the printer driver 203 converts all printing instructions from the graphic engine 202 into control commands for the printer 1500. To the contrary, in the system of Fig. 3, the application 201 is released from printing processing after the spooler 302 converts all printing instructions into intermediate code data and outputs the intermediate code data to the spool file 303. In general, the processing time is shorter in the latter system.

The system shown in Fig. 3 can process the contents of the spool file 303. This can realize a function other than the function of the application, such as

enlargement/reduction of print data from the application,
and N-up printing of reducing and printing a plurality of
pages onto one page. In backward printing, since print data
must be generally accumulated to the last, the spool file
5 303 is normally created. For this purpose, the system of
Fig. 2 is expanded to spool intermediate code data, as shown
in Fig. 3.

To process print data, a user performs settings from
a window constituting a GUI provided in advance by the
10 printer driver 203, and the printer driver 203 stores the
set contents in the RAM 2 or external memory 11.

Details in Fig. 3 will be explained. As shown in
Fig. 3, in this expanded processing system, the dispatcher
301 receives a printing instruction from the graphic engine
15 202. When the printing instruction received by the
dispatcher 301 from the graphic engine 202 is one issued
from the application 201 to the graphic engine 202, the
dispatcher 301 loads the spooler 302 stored in the external
memory 11 to the RAM 2, and transmits the printing
20 instruction not to the printer driver 203 but to the spooler
302.

The spooler 302 converts the received printing
instruction into intermediate codes, and outputs them to
the spool file 303. Also, the spooler 302 obtains process
25 settings concerning print data set in the printer driver
203 from the RAM 2 or external memory 11 via the printer

driver 203, and stores the settings in the spool file 303.
Note that the spool file 303 is generated as a file in the
external memory 11, but may be generated in the RAM 2.
Further, the spooler 302 loads the spool file manager 304
5 stored in the external memory 11 to the RAM 2, and notifies
the spool file manager 304 of the generation status of the
spool file 303.

The spool file manager 304 determines whether print
data stored in the spool file 303 can be printed in
10 accordance with the contents of the process settings. When
the spool file manager 304 determines that the print data
can be printed using the graphic engine 202, the spool file
manager 304 loads the despooler 305 stored in the external
memory 11 to the RAM 2, and instructs the despooler 305 to
15 perform printing processing of the intermediate codes
described in the spool file 303.

The despooler 305 processes the intermediate codes
included in the spool file 303 in accordance with the
contents of the process settings included in the spool file
20 303, and outputs the processed codes via the graphic engine
202 again. When the printing instruction received by the
dispatcher 301 from the graphic engine 202 is one issued
from the despooler 305 to the graphic engine 202, the
dispatcher 301 transmits a printing instruction not to the
25 spooler 302 but to the printer driver 203. The printer
driver 203 generates a printer control command and outputs

it to the printer 1500 via the system spooler 204.

(Structure of Printer)

Fig. 5 is a sectional view showing the internal structure of a laser beam printer (to be referred to as an LBP hereinafter) as an example of the printer 1500 according to the first embodiment. When the LBP is employed as the printer 1500, the LBP can receive character pattern data and the like and printing them on printing paper.

In the printer 1500, an LBP main body 740 for forming an image on printing paper serving as a printing medium based on a supplied printer control command and the like comprises the printer control unit 1000, the operation unit 1501, a laser driver 702, a semiconductor laser 703, a rotary polygon mirror 705, an electrostatic drum 706, a developing unit 707, a sheet cassette 708, convey rollers 710, an external memory 711, a face-down discharge portion 715, and delivery tray 716.

The structures and operations of the respective components will be described in detail. The printer control unit 1000 controls the whole LBP main body 740 and analyzes character pattern information and the like. The printer control unit 1000 mainly converts a printer control command into a video signal, and outputs the signal to the laser driver 702. The printer control unit 1000 can be connected to the external memory 711 for supplying font data, the emulation program of a page description language, and

the like. The operation unit 1501 has operation switches, display means (e.g., an LED display), and the like, as described above.

5 The laser driver 702 is a circuit for driving the semiconductor laser 703, and turns on/off a laser beam 704 emitted by the semiconductor laser 703 in accordance with an input video signal. The semiconductor laser 703 emits a laser beam to the rotary polygon mirror 705. The rotary polygon mirror 705 reflects the laser beam 704 to the right and left to scan the electrostatic drum 706. Scanning of the laser beam 704 forms an electrostatic latent image of a character pattern on the surface of the electrostatic drum 706.

15 The developing unit 707 surrounds the electrostatic drum 706, and develops the electrostatic latent image. A developing material such as a toner which developed the latent image is transferred onto printing paper. The sheet cassette 708 stores, e.g., cut sheets as printing paper. A pickup roller 709 and the convey rollers 710 feed a printing cut sheet in the sheet cassette 708 into the LBP main body 740, and supply the sheet to the electrostatic drum 706. In this case, a printing cut sheet can also be supplied from a manual feed tray (not shown) attached to the upper surface of the lid of the sheet cassette 708. A fixing unit 712 heats a toner image transferred to a printing cut sheet to fix the image onto the printing cut

sheet. When a switching wedge 713 is switched up, the printing sheet having the image is discharged from a face-up discharge portion 714 to the delivery tray 716 with the print surface facing up. When the wedge 713 is switched
5 down, the print sheet is discharged from the face-down discharge portion 715 with the print surface facing down.
(Operation of Despooler)

Fig. 4 is a flow chart roughly showing separation paper insertion printing (to be simply referred to as
10 separation printing) processing in the despooler 305. Setting content obtaining processing for separation printing is done (step S601). In this processing, related information including the ON/OFF state of separation paper insertion printing set by a user is obtained via a graphical
15 user interface like the one shown in Fig. 7 that is provided by the printer driver 203 and displayed on the CRT 10.

A radio button "Insert paper between OHP films" on the setting window of Fig. 7 represents separation paper insertion printing. Since this radio button is checked,
20 separation paper insertion printing is set on. It is also set that separation paper is fed from a manual feed tray and output as blank paper because a check box "Print on separation paper" is not checked.

Settings on the driver interface are obtained via the
25 spooler 302 where the settings are spooled. The spooled settings are obtained by the despooler 305. Based on the

obtained information, whether the separation printing function is set is determined (step S602). Since separation printing is set, the separation output order flag is determined (step S603)

5 The separation output order flag represents a printing order set from, e.g., an application setting window for instructing printing or from a window different from the driver setting window shown in Fig. 7 (in Fig. 7, a "paper feed" tag is selected, and if the user selects
10 another tag, another setting window is displayed.) The contents of the flag are obtained from the driver via the spooler, similar to the ON/OFF state of separation printing. It is determined whether separation paper is despoiled before or after output page data (in other words, separation
15 paper is output before or after an OHP sheet).

 In step S603, for example, the information processing system can set backward printing. When separation paper is to be output before an OHP sheet from the printer the backward printing is set, "Before output page data of the
20 text" is selected on the basis of the output order flag. In this case, backward printing is set, and thus a flag corresponding to "Before output page data of the text" is set. Hence, blank separation page despool processing is done in accordance with the above-described settings (step
25 S606), and then page data despool processing (step S607) to output a separation page before page data. Processes

Processes in step S603 and subsequent steps are repeated by the despooler 305 by the number of pages. Sheets of separation paper are inserted between respective pages to obtain output results.

5 When forward printing is designated, page data despool processing is done (step S604), and then blank separation page output processing is done (S606) to output a separation page after page data.

10 When no separation printing is set, the processing shifts from step S602 to step S608 to perform page data despool processing.

(Second Embodiment)

15 In the first embodiment, separation paper is set to be output as blank paper without printing any data. In this case, if a printer or printer driver having a conventional blank paper saving function is used without any change, the printer or printer driver does not output any separation paper. To prevent this, the second embodiment realizes normal separation printing even when the printer or printer
20 driver has the blank paper saving function and separation paper is set to blank paper.

25 Fig. 6 is a flow chart showing processing according to the second embodiment of the present invention. The second embodiment is realized by inserting processing shown in Fig. 6 between steps S602 and S603 in the first embodiment. The same processing as in the first embodiment

will be omitted. Also in the second embodiment, setting contents are shown in Fig. 7. That is, separation paper insertion printing is set on, and separation paper is fed from a manual feed tray and output as blank paper. These
5 setting contents are obtained in step S601, and it is determined in step S602 that the separation printing function is set. After that, the processing shifts to step S801.

In step S801, whether printing on separation paper
10 is instructed is checked. In this case, since separation paper is set to be output as blank paper, command issuing processing of invalidating the blank paper saving function is executed (step S803). If it is set that any data such as the same contents as those of a text page is printed on
15 a separation paper, the separation paper is not output as blank paper. Therefore, the processing skips step S803 and shifts to step S603.

The blank paper saving function is generally given to a printer, and when a page does not have any data to be
20 printed, functions not to output any blank page. In normal printing, this function is set on. In command issuing processing of invalidating the blank paper saving function in step S802, this printer function is set off. More specifically, a command of invalidating the blank paper
25 saving function in, e.g., LIPS:

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@PJL SET LPARM : LIPS PAPER - SAVE = OFF
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is issued to set off the blank paper saving function of the printer. Processes in step S603 and subsequent steps are repeated for all pages to complete printing processing. By setting off the blank paper saving function, print results using a normal separation function can be obtained. After all pages are processed, a command of setting on the blank paper saving function is desirably issued to restore the printer settings.

[Other Embodiments]

10 The blank paper saving function is given to a printer in the above-described embodiments, but may be given to a printer driver. In this case, settings of the printer driver are changed instead of issuing a command to the printer.

15 When separation paper printing cannot be set on a printing setting window or the like, determination processing in step S801 may be omitted, and the blank paper saving function may be immediately set off.

20 In the above-described embodiments, the separation printing order flag is set in accordance with printing order (forward printing/backward printing), but it may set in accordance with whether the printed sheet is discharged with the printed surface facing up or down.

25 The present invention may be applied to a system constituted by a plurality of devices (e.g., a host computer, interface device, reader, and printer) or an apparatus comprising a single device (e.g., a copying machine or

facsimile apparatus).

The object of the present invention is realized even by causing a computer (or a CPU or MPU) of a system or apparatus to read out and execute program codes stored in
5 a storage medium storing software program codes for realizing the functions of the above-described embodiments.

In this case, the program codes read out from the storage medium realize the functions of the above-described embodiments by themselves, and the storage medium storing
10 the program codes constitutes the present invention.

As a storage medium for supplying the program codes, a floppy disk, hard disk, optical disk, magnetooptical disk, CD-ROM, CD-R, magnetic tape, nonvolatile memory card, ROM, or the like can be used.

15 The functions of the above-described embodiments are realized not only when the readout program codes are executed by the computer but also when the OS (Operating System) running on the computer performs part or all of actual processing on the basis of the instructions of the program
20 codes.

The functions of the above-described embodiments are also realized when the program codes read out from the storage medium are written in the memory of a function expansion board inserted into the computer or a function expansion unit
25 connected to the computer, and the CPU of the function expansion board or function expansion unit performs part or

all of actual processing on the basis of the instructions of the program codes.

When the present invention is applied to the above storage medium, this storage medium stores program codes
5 corresponding to the above-described flow charts (shown in Figs. 4 and/or 6).

As has been described above, according to the separation paper insertion printing method and apparatus of the present invention, a system constituted by an
10 information processing apparatus such as a personal computer connected to a printer comprises a spool means for temporarily saving data in a format (so-called intermediate code) different from the format of print data to be finally transmitted to the printer before the information
15 processing apparatus generates the print data to be transmitted to the printer. The system further comprises a despool means for generating print data to be finally transmitted to the printer, from the data temporarily stored in the intermediate code format, and a means for
20 generating a printer control command. Moreover, the system has a function of printing data on OHP films while inserting separation paper in order to prevent the print results of the OHP films from overlapping each other and to serve as layout paper. This system allows a user to
25 designate the order of outputting separation paper. Even in separation printing, the user can obtain desired print

results. For example, in backward printing, the user can obtain the same print results as those of forward printing by outputting separation paper before.

5 In the system further having a blank paper saving function of not printing any page having no print data, when separation paper insertion is designated, the blank paper saving function of the device is invalidated. Thus, even when separation paper is blank, a normal separation paper insertion printing function can be provided.

10 As many apparently widely different embodiments of the present invention can be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

WHAT IS CLAIMED IS:

1. A printing control method of controlling a printing device to output predetermined data onto a printing medium, comprising:

5 a separation printing check step of checking a separating printing setting, set in advance, representing whether a predetermined medium is additionally output over each page of the output;

10 a printing order check step of checking a printing order setting, set in advance, representing whether the predetermined data is output from a final page or first page; and

15 a control step of, when the separation printing setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the first page, controlling to output each page of the output and then additionally output the predetermined medium before a next page is output, and when the separation printing setting is set to additionally
20 output the predetermined medium and the printing order setting is set to output the predetermined data from the final page, controlling to additionally output the predetermined medium before each page of the output is output.

25 2. The method according to claim 1, further comprising:
a saving state check step of checking whether the

printing device is set to a saving state in which a page having no output data is not output; and

a saving function invalidating step of invalidating setting of the saving state when setting of additionally outputting the predetermined medium is detected in the separation printing check step and setting of the saving state is detected in the saving function check step.

3. The method according to claim 1, wherein the separation printing check step comprises checking a layout paper printing setting, set in advance, representing whether a predetermined content is printed on the predetermined medium, and

the method further comprises:

a saving state check step of checking whether the printing device is set to a saving state in which a page having no output data is not output; and

a saving function invalidating step of invalidating setting of the saving state when the separation printing setting is set to additionally output the predetermined medium, and the layout paper printing setting is set off.

4. The method according to claim 1, wherein the printing medium is a transparent resin film, and the predetermined medium is paper.

5. The method according to claim 3, wherein the predetermined content is the same as a content printed on each page of the output.

each page of the output.

6. The method according to claim 1, further comprising
a spool step of converting the predetermined data into
another format and saving the converted data as a spool
5 file; and

a despooler step of mapping the spool file under
control of the control step and supplying the mapped file
to the printing device.

7. A printing control apparatus for controlling a
10 printing device to output predetermined data onto a
printing medium, comprising:

separation printing check means for checking a
separating printing setting, set in advance, representing
whether a predetermined medium is additionally output over
15 each page of the output result;

printing order check means for checking a printing
order setting, set in advance, representing whether the
predetermined data is output from a final page or first
page; and

20 control means for, when the separation printing
setting is set to additionally output the predetermined
medium and the printing order setting is set to output the
predetermined data from the first page, controlling to
output each page of the output result and then additionally
25 output the predetermined medium before a next page is output,
and when the separation printing setting is set to

5 additionally output the predetermined medium and the
printing order setting is set to output the predetermined
data from the final page, controlling to additionally
output the predetermined medium before each page of the
output result is output.

8. The apparatus according to claim 7, further
comprising:

10 saving state check means for checking whether the
printing device is set to a saving state in which a page
having no output data is not output; and

15 saving function invalidating means for invalidating
setting of the saving state when setting of additionally
outputting the predetermined medium is detected by said
separation printing check means and setting of the saving
state is detected by said saving function check means.

20 9. The apparatus according to claim 7, wherein said
separation printing check means checks a layout paper
printing setting, set in advance, representing whether a
predetermined content is printed on the predetermined
medium, and

said apparatus further comprises:

saving state check means for checking whether the
printing device is set to a saving state in which a page
having no output data is not output; and

25 saving function invalidating means for invalidating
setting of the saving state when the separation printing

setting is set to additionally output the predetermined medium, and the layout paper printing setting is set off.

10. The apparatus according to claim 7, wherein the printing medium is a transparent resin film, and the predetermined medium is paper.

11. The apparatus according to claim 9, wherein the predetermined content is the same as a content printed on each page of the output result.

12. The apparatus according to claim 7, further comprising spool means for converting the predetermined data into another format and saving the converted data as a spool file; and

despooler means for mapping the spool file under control of said control means and supplying the mapped file to the printing device.

13. A storage medium storing a program which can be executed by an apparatus, wherein the apparatus which executes the program is operated as a printing control apparatus for controlling a printing device to output predetermined data onto a printing medium, said printing control apparatus having:

separation printing check means for checking a separating printing setting, set in advance, representing whether a predetermined medium is additionally output over each page of the output result;

printing order check means for checking a printing

order setting, set in advance, representing whether the predetermined data is output from a final page or first page; and

control means for, when the separation printing
5 setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the first page, controlling to output each page of the output result and then additionally output the predetermined medium before a next page is output,
10 and when the separation printing setting is set to additionally output the predetermined medium and the printing order setting is set to output the predetermined data from the final page, controlling to additionally output the predetermined medium before each page of the
15 output result is output.

14. A printing control method comprising:
checking a printing settings including whether a plurality of different medium are to be output for each page data;
and

20 determining an output order of the plurality of different medium.

ABSTRACT OF THE DISCLOSURE

This invention relates to a printing device control method capable of outputting data while inserting separation paper between OHP sheets when it is undesirable for OHP sheets or the like that output results overlap each other. When an output order flag representing the printing order is set, and a separation printing function is set, the output order flag value is checked (S603). For backward printing, separation page output processing (S606) is performed before page data spool processing (S607). For forward printing, page data spool processing (S604) is performed before separation page output processing (S605). This makes it possible to normally output separation paper regardless of the printing order. When a printing device has a blank paper saving function, and printing on separation sheet is set off, the blank paper saving function can be invalidated to normally output separation paper.

FIG. 1

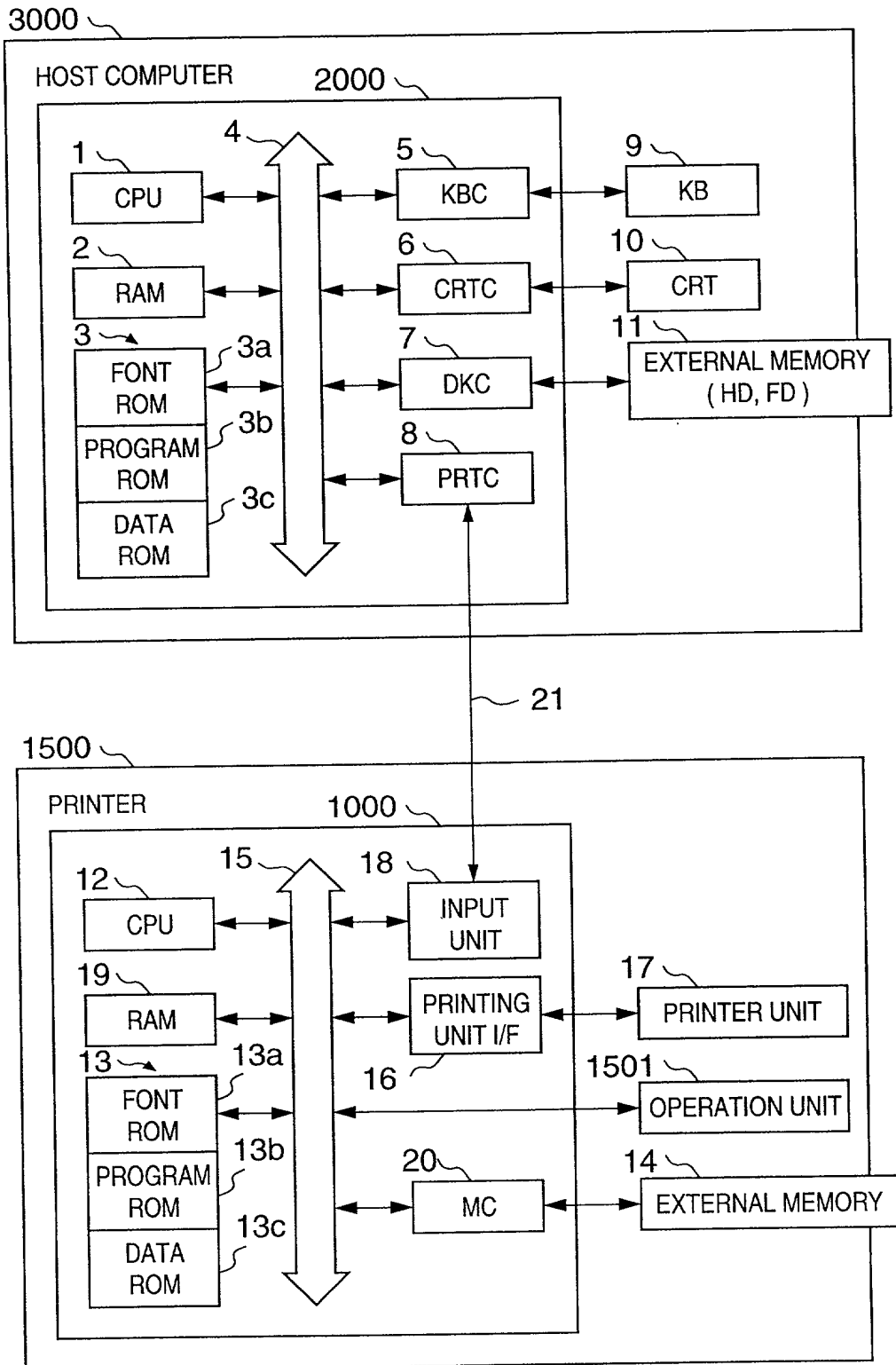


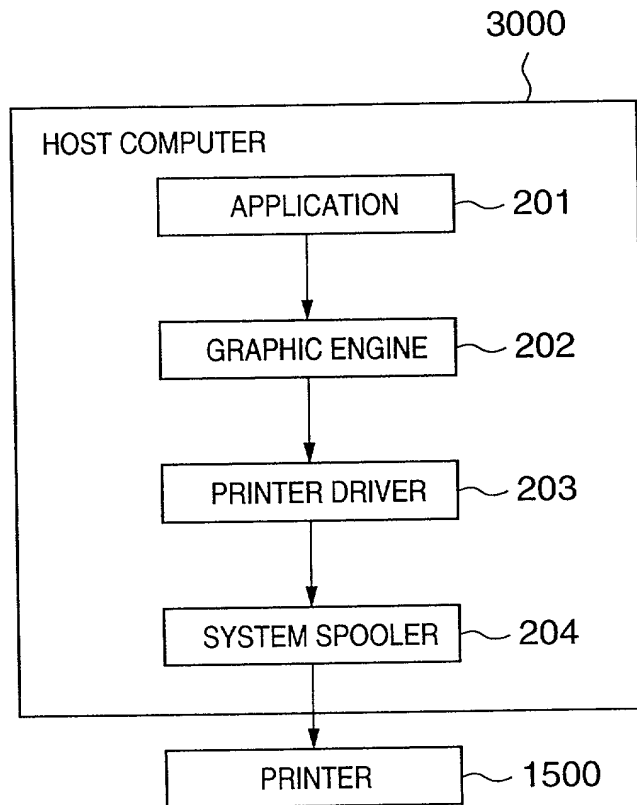
FIG. 2

FIG. 3

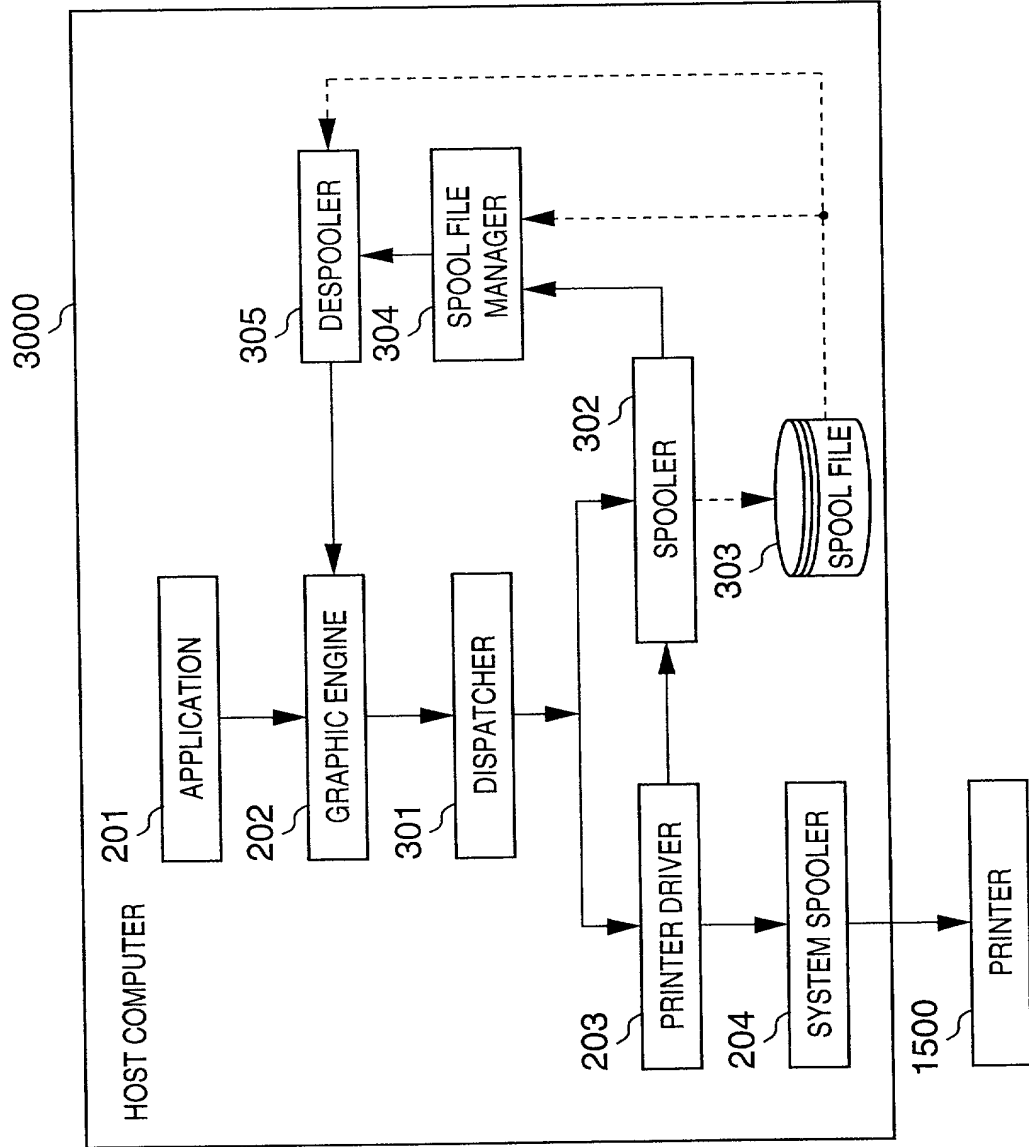


FIG. 4

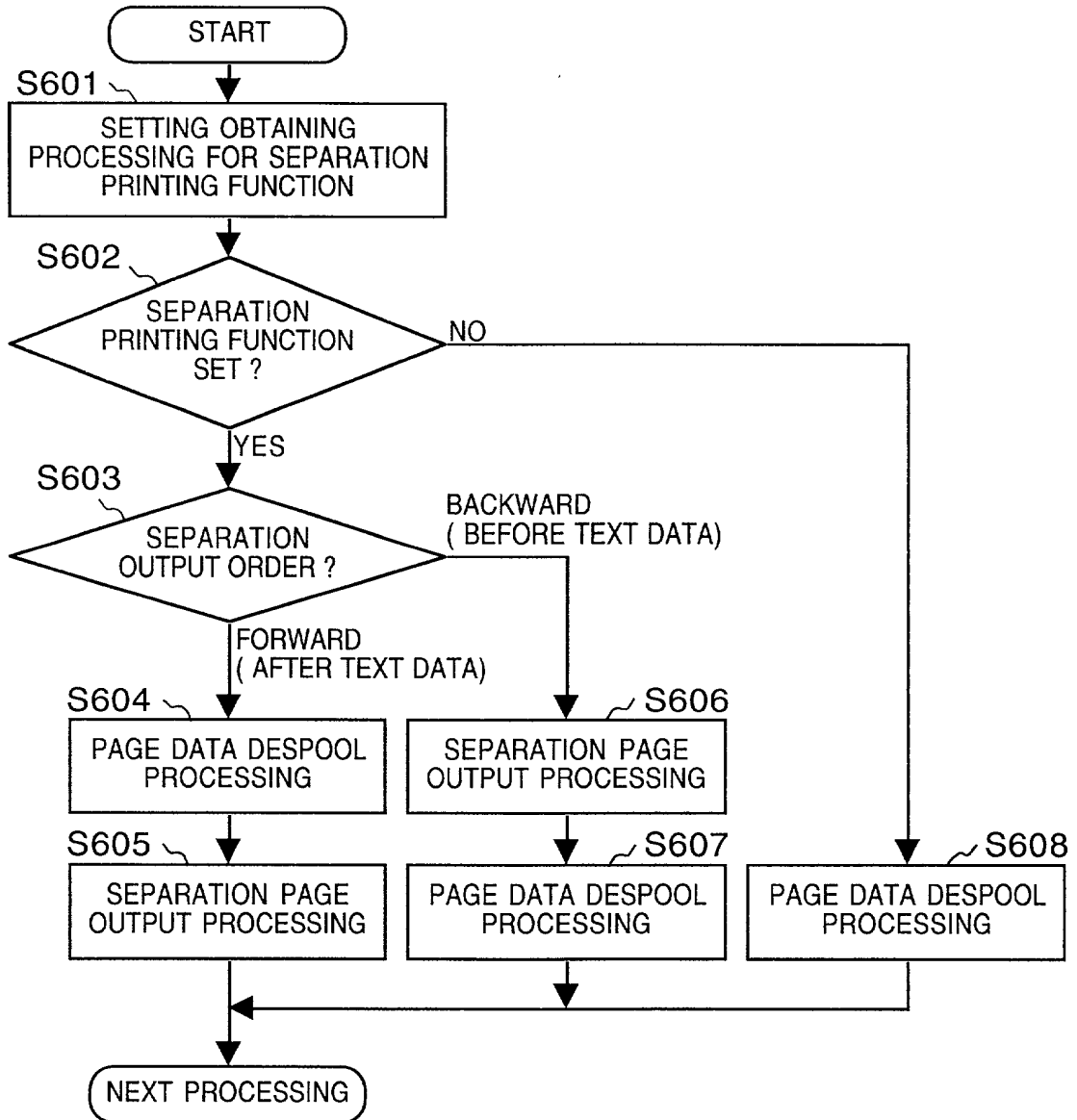


FIG. 5

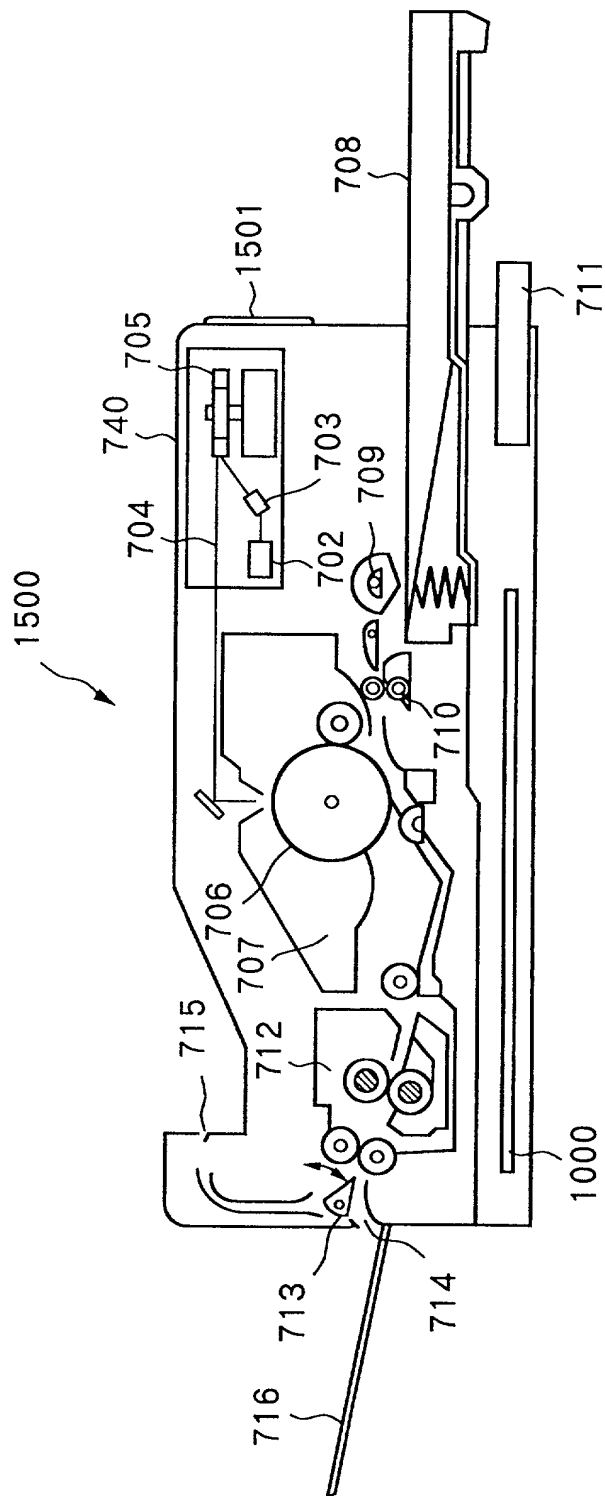


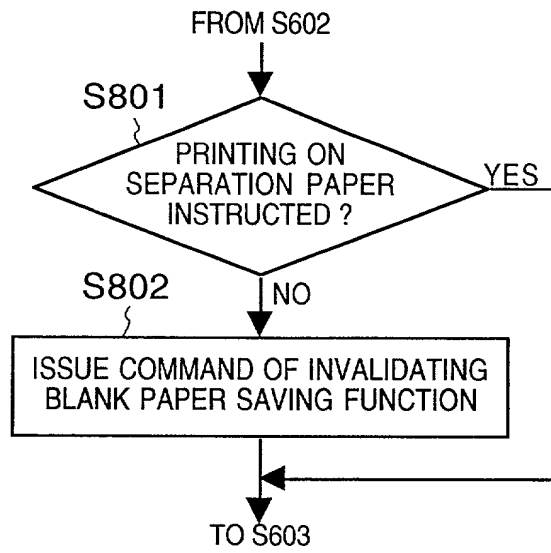
FIG. 6

FIG. 7

GENERAL

DETAILS

SHARE

PAGE
SETTINGS

FINISH

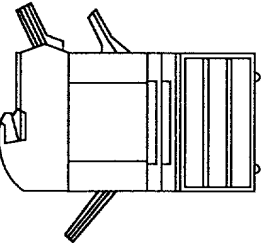
PAPER
FEED

QUALITY


DEVICE
SETTINGS

?

✕



AUTO



A4→A4

CONFIRM SETTINGS

FEED METHOD

☐ PRINT ALL PAGES ON THE SAME PAPER

☐ PRINT FIRST OR FINAL PAGE ON SEPARATE PAPER

☐ PRINT FIRST AND NEXT PAGES AND FINAL PAGE ON SEPARATE PAPER

☒ INSERT PAPER BETWEEN OHP FILMS

SEPARATION PAPER

☐ PRINT ON SEPARATION PAPER

MANUAL FEED




▼

AUTO

▼

ADD

EDIT



DEFAULT

OK

CANCEL

APPLY (A)

HELP

**COMBINED DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION**

(Page 1)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PRINTING CONTROL METHOD AND APPARATUS

the specification of which [X] is attached hereto. [] was filed on _____

as United States Application No. or PCT International Application No. _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or §365(b), of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designates at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed:

<u>Country</u>	<u>Application No.</u>	<u>Filed (Day/Mo./Yr.)</u>	<u>(Yes/No)</u> <u>Priority Claimed</u>
JAPAN	10-365513	22/12/1998	Yes

I hereby appoint the practitioners associated with the firm and customer number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to the address associated with that Customer Number:

FITZPATRICK, CELLA, HARPER & SCINTO
Customer Number: 05514

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

(Page 2)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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